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Arctic monitoring stations for main atmospheric compounds

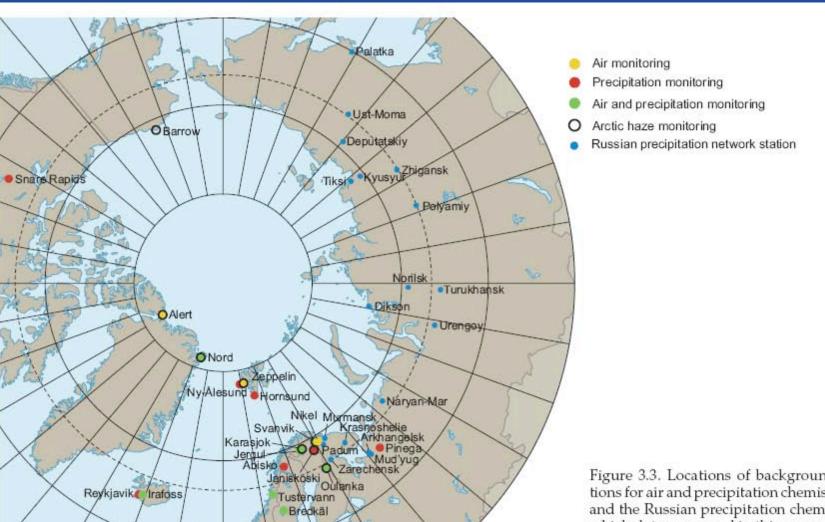


Figure 3.3. Locations of background monitoring stations for air and precipitation chemistry, and arctic haze and the Russian precipitation chemistry stations from which data were used in this assessment.

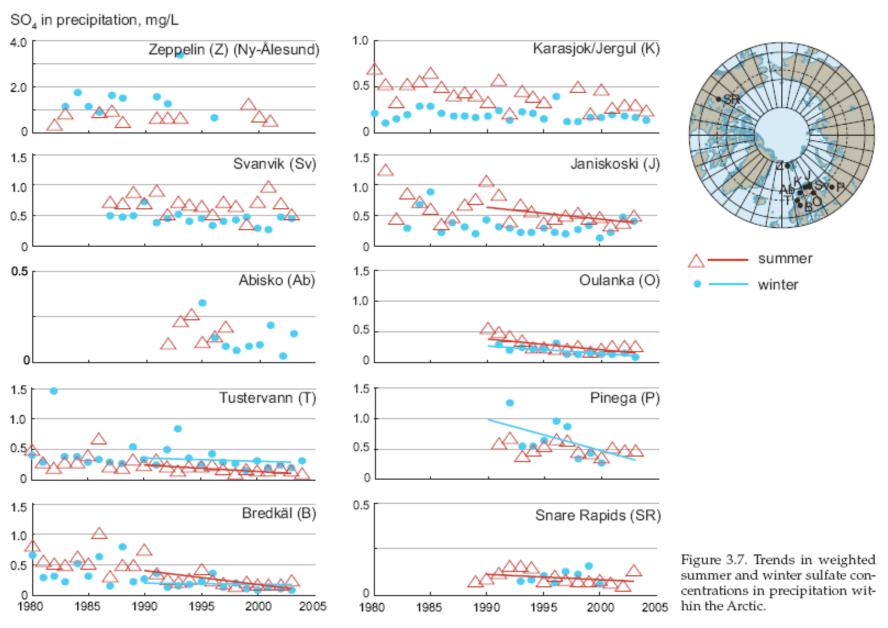
Current situation: Emissions of SO2 (left) and NOx (right) for the year 2000 (data mostly from EDGAR database)



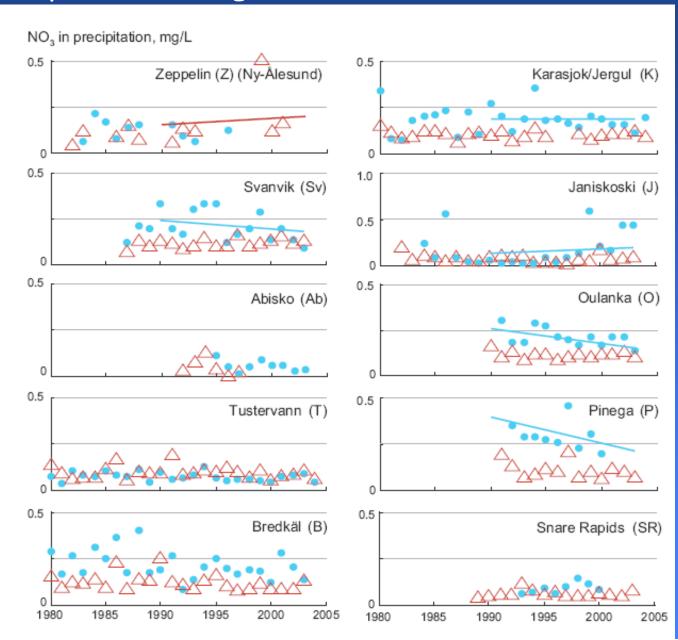
Mean surface concentrations of SOx for year 2000.

How have concentrations varied in the past?

Trends for weighted sulphate concentrations in precipitation in mg/l. summer and winter.



Trends for weighted nitrate concentrations in precipitation in mg/l. summer and winter.



Arctic monitoring stations for main atmospheric compounds

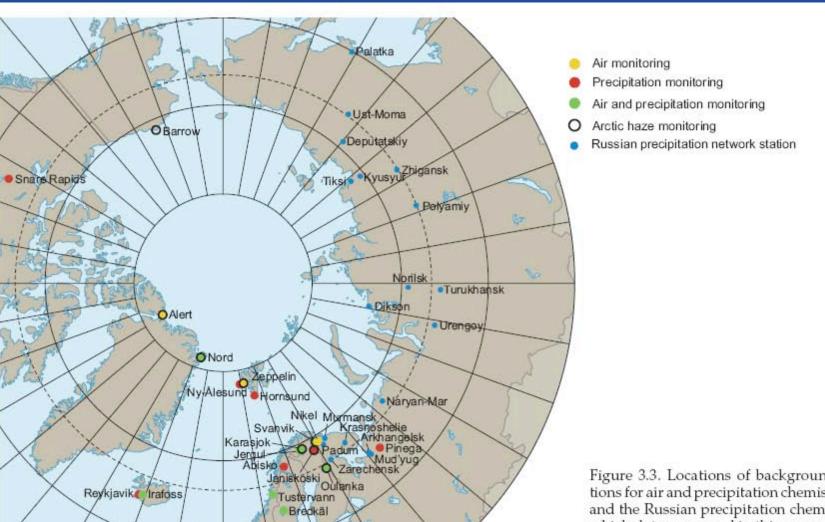
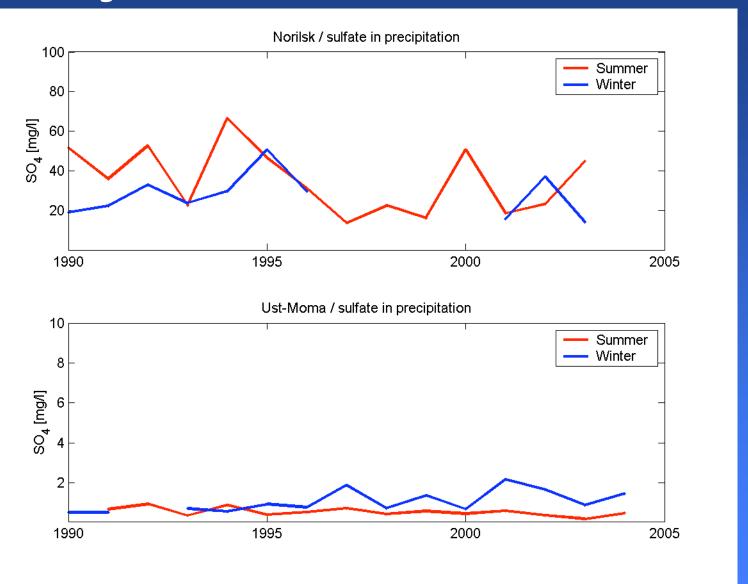
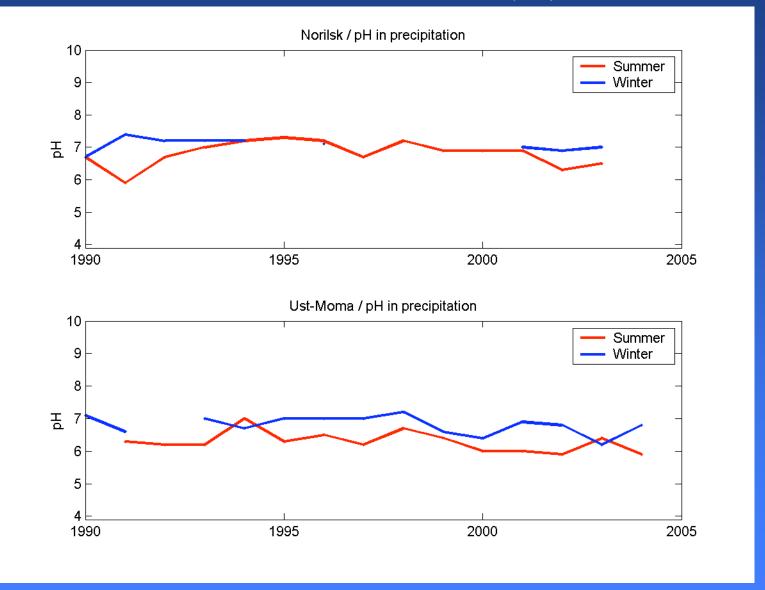


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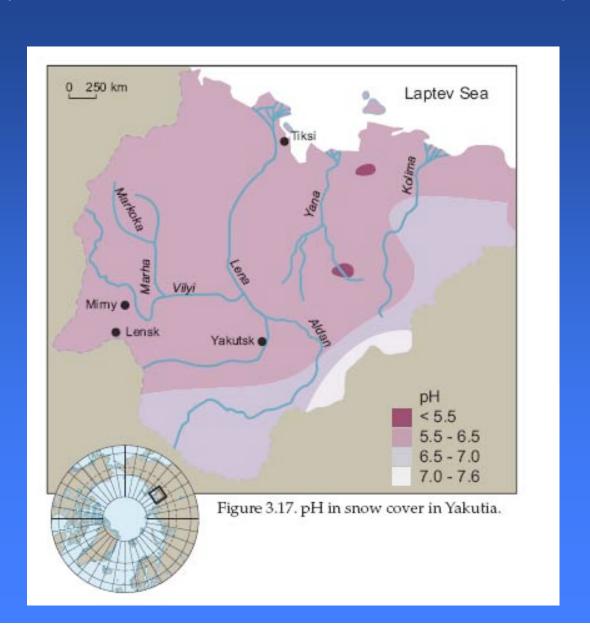
Huge differences in sulfate concentrations



No connection to acidity (pH)



Air pollution influences snow cover acidity



The Danish Eulerian Hemispherical Model (J. Christensen, DMU

- ·Based on MM5 mesoscale model
- •Emissions on 1°x1° grid from the EDGAR database
- •EMEP (50 k)
- •NH3 and NOx from lightning and soil emissions from global GEIA are used



Yes, partly, but some discrepancies

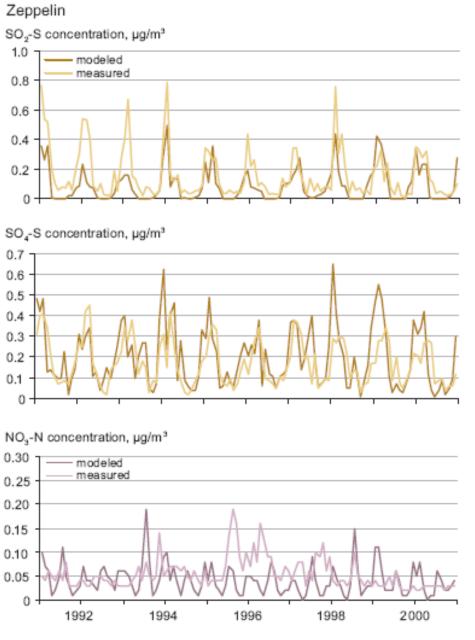
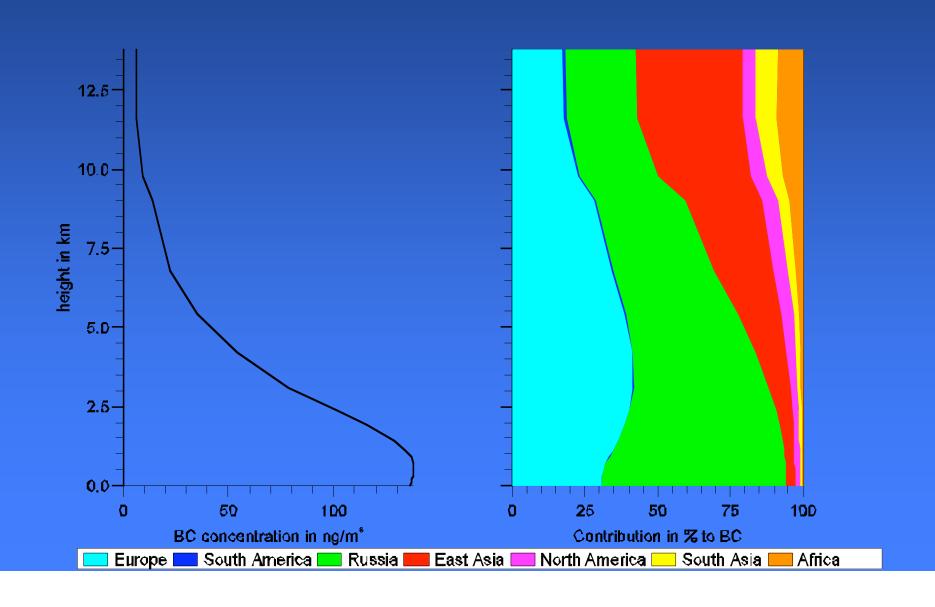


Figure 3.23 Time series of measured and modeled monthly concentrations of sulfur dioxide, sulfate, and nitrate at Zeppelin (Spitsbergen).

Where does the pollution come from?

Black Carbon:

Vertical profile for the Arctic area North of Polar Circle.

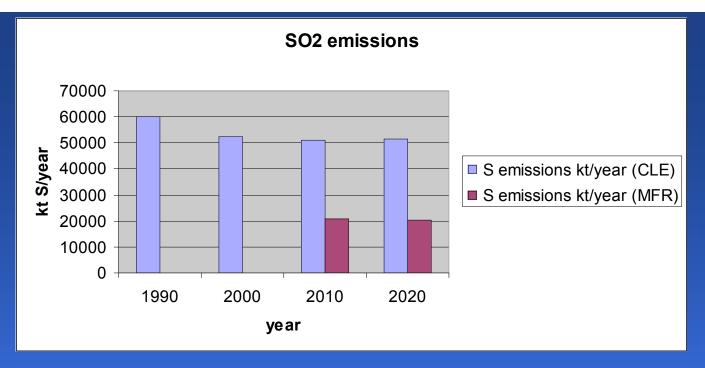


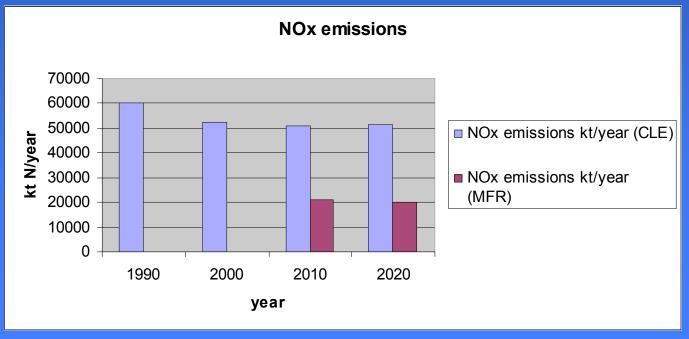
What about the coming decades?

Two emission scenarios:

A "Current Legislation" (CLE)

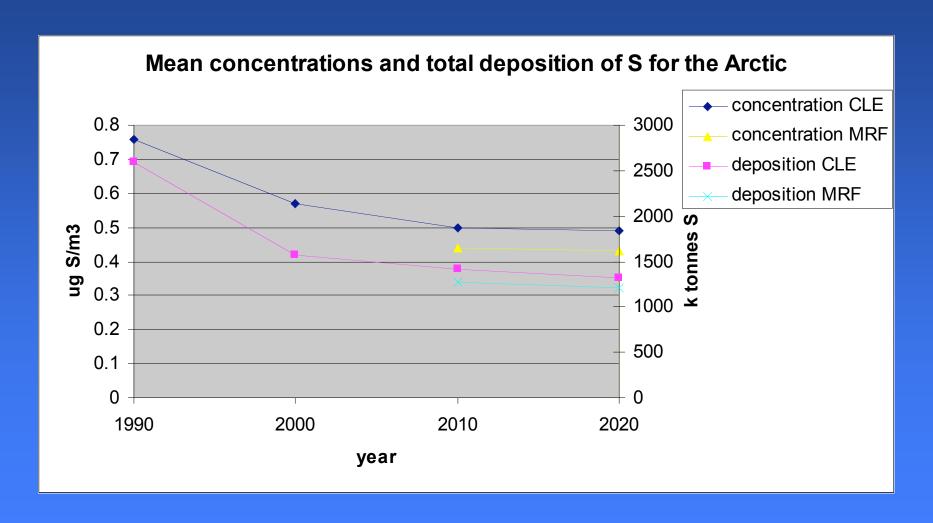
B "Maximum technically Feasible Reduction" (MFR)





Scenarios: Emissions of SO2 for year 2020

CLE 2020 51000 ktonnes MFR 2020 20000 ktonnes The total mean concentrations and total depositions of SOx for the area north of Arctic Circle for the different emissions scenarios.



Arctic pollution is still an issue! -extreme transport event on Svalbard May 2006



Photo: Ann-Christine Engvall, Univ. Stockholm

Climate change might affect pathways



Photo: Ann-Christine Engvall, Univ. Stockholm

Some Recommendations

Establish additional background stations for air and precipitation chemistry in Russia, Northern Canada and Alaska.

Measurements during field campaigns, e.g., during summer season to obtain dry deposition velocities for model improvement.

Use of measurements for model validation for S and N species and black carbon.

Thank you!

